

Investigation of Myalgia and Related Factors in COVID-19 Quarantine Center Patients- A Retrospective Study

COVID-19 Karantina Merkezi Hastalarında Miyalji ve İlişkili Faktörlerin İncelenmesi-Retrospektif Çalışma

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ABSTRACT

Background: This study was conducted retrospectively to examine myalgia and related factors in patients who did not have the symptoms of illness severe enough to be hospitalized in a quarantine center due to Coronavirus disease-2019 (COVID-19). A retrospective evaluation was performed to examine the relationship between myalgia that started after infection and age, gender, chronic disease, presence of lung involvement and other COVID-19 symptoms such as cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, and fatigue.

Materials and Methods: Four hundred-eighty-seven patients hospitalized in the quarantine center between June 2020 and September 2020 were evaluated. Myalgia, age, gender, chronic disease status (diabetes mellitus, hypertension, cardiac and pulmonary diseases and endocrinological diseases), other COVID-19 related symptoms (cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, fatigue), and radiological findings of COVID-19 infected patients were retrospectively examined. Frequency tables and descriptive statistics were used to interpret the findings.

Results: Myalgia was seen at a rate of 33.3% and lung tomography findings were positive at a rate of 39.6% even in patients infected with COVID-19, who did not require hospitalization. Although myalgia did not seem to be associated with age, gender, and chronic diseases, 64% of patients with myalgia had other COVID-19 related symptoms such as cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, and fatigue.

Conclusion: Symptoms most commonly associated with myalgia include cough, weakness and sore throat. It is important to question other symptoms and monitor lung findings, and to closely follow uppatients who are not hospitalized.

Keywords: Quarantine center, myalgia, COVID-19

ÖZ

Amaç: Bu araştırmada Koronavirüs hastalığı-2019 (COVID-19) enfeksiyonu nedeniyle karantina merkezinde kalan hastalarda, serviste ya da yoğun bakımda yatacak kadar ağır hastalık semptomları olmayan, enfekte olduktan sonra başlayan miyalji ve yaş, cinsiyet, kronik hastalık, akciğer tutulumu varlığı ve COVID-19 enfeksiyonunda görülen öksürük, boğaz ağrısı, baş ağrısı, bulantı, ishal, tat/koku kaybı, burun tıkanıklığı, nefes darlığı, halsizlik gibi diğer COVID-19 ilişkili semptomlarla ilişkili faktörlerin incelenmesi amacıyla retrospektif değerlendirme yapılmıştır.

Gereç ve Yöntemler: Karantina merkezinde Haziran-Eylül 2020 tarihleri arasında kalan 487 COVID-19 ile enfekte hastaların, enfekte olduktan sonra başlayan miyaljileri olup olmadığı, yaş, cinsiyet, kronik hastalık durumları (diyabet mellitus, hipertansiyon, kardiyak ve pulmoner hastalıklar ve endokrinolojik hastalıklar), diğer COVID-19 semptomları (öksürük, boğaz ağrısı, baş ağrısı, bulantı, ishal, tat/koku kaybı, burun tıkanıklığı, nefes darlığı, halsizlik) ve radyolojik bulguları retrospektif olarak incelenmiştir. Bulguların yorumlanmasında frekans tabloları ve tanımlayıcı istatistikler kullanılmıştır.

Bulgular: COVID-19'la enfekte hastalarda yeni başlayan miyalji görülme oranı %33,3 olup, akciğer tomografisi bulguları %39,6 oranında pozitifdir. Miyaljili hastaların %64'ünde öksürük, boğaz ağrısı, baş ağrısı, bulantı, ishal, tat/koku kaybı, burun tıkanıklığı, nefes darlığı, halsizlik gibi diğer COVID-19 ilişkili semptomlar görülmektedir. Miyalji ile yaş, cinsiyet ve kronik hastalıklar arasında istatistiksel olarak anlamlı bir ilişki yoktur.

Sonuç: En fazla miyalji ile birlikte görülen semptomlar öksürük, halsizlik ve boğaz ağrısıdır. Hastanede yatarak takip olmayan hastaların da yakından takibi, diğer semptomlarının sorgulanması ve akciğer bulgularının izlenmesi önemlidir.

Anahtar Kelimeler: Karantina merkezi, miyalji, COVID-19



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Introduction

Coronavirus disease-2019 (COVID-19) has a fairly wide clinical spectrum, covering severe acute respiratory syndrome, respiratory failure caused by pneumonia, and even death, with a very high pathogenity and contagion, first identified in Wuhan, China (1). Although symptoms at the onset of the disease vary, the predominant symptoms are fever and cough while gastrointestinal symptoms are rarer. In addition, headache, conjunctival hyperemia, nasal congestion, sore throat, increased secretion, sputum, weakness, hemoptysis, nausea-vomiting, diarrhea, abdominal pain, myalgia, rash, impaired taste, and sense of smell may also be observed in patients (2,3,4).

It may not be necessary to treat patients infected with COVID-19 with mild clinical presentation but without viral pneumonia and hypoxia primarily in hospital, and many patients may be monitored at home. The decision to monitor a patient should be made according to the patient's clinical condition. This decision varies depending on the clinical picture of the disease, the need for supportive care, their chronic illness, and the patient's ability to isolate himself/herself at home. Patients with risk factors for severe disease should be closely monitored, taking into account the risk of progression to a serious disease in sometime after symptoms begin (5). For this purpose, quarantine centers have been established in our country and patient monitoring and clinical course of the disease are evaluated.

Musculoskeletal symptoms are also frequently observed during COVID-19 infection. It is known that 50% of infected people have widespread body pain, 37.5% have myalgia, 5.7% have arthralgia, and 6.8% have back pain (6). From the onset of symptoms and during the most severe stages of COVID-19 disease, musculoskeletal symptoms including myalgia, arthralgia and fatigue are very common complaints although the mechanism of COVID-19 on musculoskeletal system is still unclear (7).

Different opinions on the mechanism of myalgia, one of the most common symptoms, are found in the literature. One is about increased lactate levels due to cell damage (8). While high lactate level reduces the oxygen carrying capacity of erythrocytes to the tissues, it causes hypoxia, and muscle pain may be seen due to low pH. The virus may spread through the blood and endothelium, causing infection in the heart and brain tissues, and therefore the musculoskeletal system may be adversely affected by the infection. Increased creatinine kinase (CK) level during the infection process is evidence of muscle involvement (9).

In a study examining the relationship of myalgia with COVID-19 severity and mortality, it was reported that the presence of myalgia was not associated with the prognosis of

the infection (10). Kucuk et al. (9) reported that back pain seen during the COVID-19 process might be related to pneumonia, common myalgia might be longer and more severe than other infectious diseases and would not respond to traditional painkillers. In addition, it was pointed out that the severity of myalgia was possible only when the viral load was reduced with treatment (red blood cell oxygenation increases and muscle lactate level decreases). In the study of Batur et al. (11) it was determined that there was a significant increase in CK level and lymphocyte count in people with myalgia symptoms and hemoglobin levels decreased significantly and D-dimer increased significantly in people with chronic diseases. Therefore, it is recommended that patients should be followed up in terms of myopathic process and other related factors (11).

In this study, it was aimed to examine the patients who did not have symptoms of illness severe enough to be hospitalized, staying in quarantine center due to COVID-19 in terms of myalgia symptom and related factors to obtain results that can contribute to the literature and to provide recommendations that can be used in myalgia management.

Material and Methods

Study Design

The population of the research is the past records of 487 patients who stayed in Physical Therapy Hospital Quarantine Center between June 2020 and September 2020. Ethical and scientific approval was obtained with the decision numbered 2021/04-07 at Kütahya Health Sciences University Clinical Research Ethics Committee Meeting dated 10.03.2021. The data of the study were collected by retrospectively examining the past records to investigate the relationship between myalgia that started after infection and age, gender, chronic disease, presence of lung involvement and other COVID-19 symptoms such as cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, and fatigue seen in the quarantine center during the COVID-19 process.

Clinical Data

The data of the study were collected by retrospectively examining the past records of age, gender, chronic disease status (diabetes mellitus, hypertension, cardiac and pulmonary diseases and endocrinological diseases), radiologic findings and other COVID-19 related symptoms (cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, fatigue) of the patients who were hospitalized in the quarantine center between June 2020 and September 2020. The inclusion criteria were having positive COVID-19 test and having myalgia after positive tests. The

exclusion criteria were having moderate or more symptoms that required hospitalization, having O_2 saturation values of 95% and below, having previous myalgia or musculoskeletal disease pain.

Statistical Analysis

Statistical analysis was performed using a package program called SPSS (IBM SPSS Statistics 24). Frequency tables and descriptive statistics were used to interpret the findings. Non-parametric methods were used for the measurement values that were not suitable for the normal distribution. In accordance with non-parametric methods, the "Mann-Whitney U" test (Z-table value) was used to compare the measurement values of two independent groups. The expected Pearson- χ^2 cross tabs were employed to examine the relationship between two qualitative variables.

Results

The findings of our retrospective study are given in the tables below, which we conducted to examine myalgia and related factors in patients staying in the quarantine center during the COVID-19 process. Table 1 shows the number and frequencies patients in terms of the presence of myalgia, gender, computed tomography results, chronic disease, and age.

It was determined that 325 patients (66.7%) did not have myalgia, 274 (56.3%) were male, 294 patients (60.4%) had negative computed tomography (CT) results and 307 (63%) patients did not have a chronic disease (Table 1). The ages of the patients ranged from 10 to 89 years, with an average age of 43 years.

The findings in which the presence of myalgia and related factors were evaluated in the patients are presented in Table 2.

There was no statistically significant relationship between myalgia status and gender, CT and chronic disease

Variable (n=487)	n	%
Myalgia		
No	325	66.7
Yes	162	33.3
Gender		
Female	213	43.7
Male	274	56.3
CT		
Positive	193	39.6
Negative	294	60.4
Chronic disease		
No	307	63.0
Yes	180	37.0

CT: Computed tomography

status ($p>0.05$). A significant relationship was found between myalgia status and other symptoms ($p<0.05$). It was determined that 277 people without myalgia (85.2%) had no other symptoms, and 105 people with myalgia (64.8%) had other symptoms. Although not statistically significant, the most common symptoms with myalgia were cough, weakness and sore throat. The least common symptom was nasal congestion (Table 2).

Discussion

In this study, according to the retrospective data, it was determined that the average age of the patients staying in the quarantine center was 43 years, 56.3% were male, and 37% had a chronic disease. In a study conducted in Iran, it was concluded that the median age of 595 COVID-19 patients hospitalized was 55 years, and 401 (67.4%) were male (12). As a result of a study conducted in Italy, it was determined that the average age of the patients was 65 years, 72.9% were male and 56.3% had a chronic disease (13). According to the results of the research, it is understood that the cases are mainly male and approximately half of the cases followed by hospitalization have chronic diseases. In our study, it is predicted that the average age of patients with infected COVID-19 who do not require hospitalization is lower than those who require hospitalization in the literature, but

Table 2. Examination of the relationship between myalgia status and other characteristics

Myalgia Status	No N=325		Yes N=162		Statistical analysis*
	n	%	n	%	
Gender					
Female	147	45.2	66	40.7	$\chi^2=0.886$ $p=0.347$
Male	178	54.8	96	59.3	
CT					
Negative	208	64.0	99	61.1	$\chi^2=0.387$ $p=0.534$
Positive	117	36.0	63	38.9	
Chronic disease					
No	208	64.0	99	61.1	$\chi^2=0.387$ $p=0.534$
Yes	117	36.0	63	38.9	
Other symptoms					
Yes	48	14.8	105	64.8	$\chi^2=125.667$ $p=0.000$
No	277	85.2	57	35.2	
Other symptoms**					$\chi^2=116.30$ $p=0.107$
Cough	19	38.8	34	29.8	
Sore throat	2	4.1	17	14.9	
Headache	3	6.1	12	10.5	
Nausea	3	6.1	2	1.8	
Diarrhea	4	8.2	10	8.8	
Taste/smell loss	8	16.3	14	12.2	
Nasal congestion	1	2.0	1	0.9	
Dyspnea	5	10.2	5	4.4	
Weakness	4	8.2	19	16.7	

CT: Computed tomography

hospitalization may be required as age increases. In terms of gender, male dominance in infected patients was found to be compatible with the literature.

According to the findings obtained from our study, it was determined that 33.3% of the patients staying in the quarantine center had myalgia. According to the results of all studies in the systemic review of Mesquita et al. (14) the incidence of myalgia is 16.7%. In the study of Flores-Silva et al. (15) it was reported that myalgia symptom was seen at a rate of 38.5% among 1072 hospitalized patients.

Even after excluding initial clinical signs and pre-existing comorbidities, new symptoms and complications may occur in hospitalized COVID-19 patients (15). By the way, our study is important in terms of determining the incidence of myalgia in infected COVID-19 cases that do not require hospitalization. The presence of chronic diseases, hypertension, cardiovascular disease, diabetes mellitus, chronic lung disease, malignancies, especially hematological, immunosuppressive therapy or disease, organ transplantation, chronic kidney failure, obesity, and smoking can be considered risk factors for mortality based on the literature (1,2,3,5). In a meta-analysis by Wang et al. (16) involving 1,558 patients and six studies in China, chronic obstructive pulmonary disease, cardiovascular disease, diabetes mellitus, and hypertension were found to be the most important independent risk factors, respectively (16). In a subgroup study by Onder et al. (17) consisting of 355 patients who died due to COVID-19, the mean number of pre-existing comorbidities was 2.7, and no underlying comorbidity was found in only three (0.3%) patients. In this respect, the presence of chronic disease in patients infected with COVID-19 is very important in terms of the course of the disease and the clinical condition of the patient.

In our study, it was concluded that myalgia symptom was not related to age, gender and chronic disease, but 64.8% of people with myalgia had other symptoms (cough, sore throat, headache, nausea, diarrhea, loss of taste/smell, nasal congestion, dyspnea, weakness). However, it is important to examine whether there are other symptoms in people with myalgia, which is one of the most common symptoms, besides being followed up in the hospital.

Chest CT plays an important role in the recognition of highly suspicious findings of COVID-19, both typical and atypical (18). The hallmarks of COVID-19 infection on imaging are being bilateral, peripheral ground glass and consolidative pulmonary opacities. It is known that especially 56% of early patients have normal computed tomography findings (19). According to the results of a study conducted in four centers in China, chest CT scans of 121 infected symptomatic patients were reviewed for common CT findings in relation to the time between symptoms, and initial and first CT scan

was performed in 36 patients (0-2 days- in early), 33 patients, (3-5 days -in the middle period) and 25 patients (6-12 days- in the late period) (19). In this study, COVID-19 symptoms in the computed tomography results were positive in 39.6% of the cases. In the literature, it has been reported that there is a significant correlation between the degree of pulmonary inflammation determined by CT and the main clinical symptoms and laboratory results (20). In our study, similar to the literature, it was determined that 68.2% of people with COVID-19 symptoms on CT had myalgia and 29.8% of people with myalgia had cough. CT is an important method in the follow-up of the infection process and in determining which phase it is, but it is important not only to depend on the CT results but also to monitor other symptoms in order to prevent possible complications. In a recent article, it is suggested that CT results of patients should be considered for patient-specific comorbidities and other medical conditions (added pneumonia, underlying heart failure or fluid overload, and rheumatologic diseases) (21). It is important to detect the lung involvement of the patients who survive by staying at home during the disease process, without hospitalization. There is a need for more studies that include more patient groups, especially those with moderate pulmonary involvement and who do not require hospitalization, and which can correlate with factors that decrease or increase disease activity.

Study Limitations

In this study, there were patients infected with COVID-19 who stayed in the quarantine center and did not require hospitalization. The presence of myalgia was questioned but the localization of myalgia was not questioned.

In addition, advanced blood tests such as inflammation markers, creatine kinase values, and lactate values that might be associated with myalgia were not evaluated.

Conclusion

According to our retrospective data examined and the findings obtained from the literature, it has been concluded that myalgia is a frequently seen symptom and can be seen together with other symptoms. Myalgia is not associated with chronic diseases, age, and gender, but is associated with other COVID-19 symptoms. The rate of myalgia was seen at a rate of 33.3% and computed lung tomography findings were positive at a rate of 39.6% even in patients infected with COVID-19, who did not require hospitalization. Symptoms most commonly associated with myalgia are cough, weakness and sore throat. It should be kept in mind that there are additional symptoms and lung involvement in patients who do not require hospitalization, and close follow-up is very important for these patients. By the way, this study is the first quarantine center study to retrospectively examine

myalgia and related symptoms in COVID-19 patients who do not require hospitalization.

Ethics

Ethics Committee Approval: This study was obtained with the decision numbered 2021/04-07 at Kütahya Health Sciences University Clinical Research Ethics Committee meeting dated 10.03.2021.

Informed Consent: The study was designed retrospectively.

Peer Review: Externally and internally peer-reviewed

Authorship Contributions

Surgical and medical practice: A.Ö., G.Ü., H.H.G., C.Ö., Concept: A.Ö., G.Ü., H.H.G., C.Ö., G.B., Data collection or Processing: A.Ö., G.Ü., H.H.G., C.Ö., G.B., Literature Search and Writing: A.Ö., G.Ü., H.H.G., C.Ö., G.B.

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